APPLICATION UNDER UNITED STATES PATENT LAWS

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Invention: LIQUID DISPENSER

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SPECIFICATION

LIQUID DISPENSER

BACKGROUND OF THE INVENTION

1. Field of the invention

This invention relates to a liquid dispenser, more particularly to a disposable liquid dispenser for taking a liquid sample and for dispensing dropwise the sample to an analyzing device.

2. Description of the related art

Figs. 1 and 2 illustrate a conventional disposable liquid dispenser 10 for taking a liquid sample, such as urine and the like, and for dispensing dropwise the sample to an analyzing device for making a diagnosis, such as pregnancy diagnosis. The liquid dispenser 10 is made of plastic, and has an elongated lower tubular portion 11 and an upper enlarged portion 12 extending from the lower tubular portion 11. The enlarged portion 12 is elastic and is compressible so as to generate a suction force in the tubular portion 11 when the enlarged portion 12 is pressed and is subsequently released. The suction force enables the liquid dispenser 10 to take the liquid sample to be analyzed into the tubular portion 11. The sample is then dispensed to the analyzing device by pressing the enlarged portion 12.

The aforesaid liquid dispenser 10 is disadvantageous in that it is rather difficult to control a predetermined amount of the liquid sample

to be dispensed to the analyzing device and that an excessive amount of liquid sample may be dispensed when the enlarged portion 12 is over compressed. Moreover, since the holding position for holding the liquid dispenser 10 is located at the enlarged portion 12, it is relatively inconvenient to carry the liquid dispenser with the liquid sample therein and there is a possibility of accidental dropping of the liquid sample.

SUMMARY OF THE INVENTION

Therefore, it is an object of the present invention to provide a liquid dispenser that is capable of overcoming the aforementioned drawbacks.

According to the present invention, a plastic liquid dispenser for dropwise dispensing liquid comprises: an elongated tube having a closed first top end, an open first bottom end opposite to the first top end, a first peripheral wall extending between the first top and bottom ends and confining a first receiving space, and a first opening formed in the first peripheral wall adjacent to the first top end; and a closed shell having a second top end, a second bottom end opposite to the second top end, a second peripheral wall that extends between the second top and bottom ends, that confines a second receiving space, and that is connected sidewise to the tube, and a second opening formed in the second peripheral

wall and aligned axially with and in fluid communication with the first opening, the second peripheral wall having an upper portion that is resilient and that is compressible so as to generate a suction force in the first and second receiving spaces when the upper portion of the second peripheral wall is pressed and is subsequently released, the second opening being formed in the upper portion of the second peripheral wall, the first bottom end of the tube protruding downward relative to the second bottom end of the shell.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate an embodiment of the invention,

Fig. 1 is a front view of a conventional disposable liquid dispenser;

Fig. 2 is a side view of the liquid dispenser of Fig. 1;

Fig. 3 is a front view of a disposable liquid dispenser embodying this invention;

Fig. 4 is a cross-sectional view of the liquid dispenser taken along line IV-IV of Fig. 3; and

Fig. 5 is a side view of the liquid dispenser of Fig. 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Figs. 3 to 5 illustrate a disposable liquid dispenser 15 embodying this invention for taking a

liquid sample, such as urine and the like, and for dispensing dropwise the sample to an analyzing device for making a diagnosis, such as pregnancy diagnosis. The liquid dispenser 15 is made of transparent plastic, and includes: an elongated tube 20 having a closed first top end 21, an open first bottom end 23 opposite to the first top end 21, a first peripheral wall 24 extending between the first top and bottom ends 21, 23 and confining a first receiving space 25, and a first opening 26 formed in the first peripheral wall 24 adjacent to the first top end 21; and a closed shell 30 having a second top end 31, a second bottom end 32 opposite to the second top end 31, a second peripheral wall 301 that extends between the second top and bottom ends 31, 32, that confines a second receiving space 35, and that is connected sidewise to the tube 20, and a second opening 36 formed in the second peripheral wall 301 and aligned axially with and in fluid communication with the first opening 26. The first bottom end 23 of the tube 20 protrudes downward relative to the second bottom end 32 of the shell 30. The second top end 31 of the shell 30 is substantially flush with the first top end 21 of the tube 20.

The shell 30 is generally rectangular in shape. The second peripheral wall 301 has opposite front and rear side walls 305, 306 extending between the second

top and bottom ends 31, 32, and opposite left and right side walls 307, 308 interconnecting the front and rear side walls 305, 306. The second opening 36 is formed in the left side wall 307 adjacent to the second top end 31. The left side wall 307 of the shell 30 is integrally formed with the tube 20.

The liquid dispenser 15 further includes a structure reinforcing rib 39 that extends upright from the second bottom end 32 and that extends between and that interconnects the front and rear side walls 305, 306. The rib 39 is integrally formed with the shell 30. The second peripheral wall 301 has an upper portion 302 that extends downward from the second top end 31 to a level corresponding to a top edge of the rib 39 (indicated as reference character "X" in Fig. 3), and a lower portion 303 that extends from the upper portion 302 to the second bottom end 32. The upper portion 302 of the second peripheral wall 301 is resilient and is compressible so as to generate a suction force in the first and second receiving spaces 25, 35 when the upper portion 302 of the second peripheral wall 301 is pressed and is subsequently released. The rib 39 enhances the structural strength of the lower portion 303 of the second peripheral wall 301, thereby permitting the lower portion 303 to have a hardness that is sufficient to prevent accidental dropping of the liquid sample when the lower portion

303 is held by the user. The second receiving space 35 has upper and lower spaces 351, 352 that are respectively confined by the upper and lower portions 302, 303 of the second peripheral wall 301. The upper space 351 of the second receiving space 35 has a volume greater than that of the first receiving space 25.

When in operation, the liquid sample fills the first receiving space 25 in the tube 20, while excess amount of the liquid sample enters into the lower space 352 of the second receiving space 35 in the shell 30. As such, a fixed amount of the liquid sample, i.e. an amount substantially equal to the volume of the first receiving space 25, can be dispensed by using the liquid dispenser 15 of this invention.

Preferably, the second top end 31 is spaced apart from the second opening 36 by a vertical distance (indicated as reference character "S1" in Fig. 5) that is sufficient to prevent the liquid sample from being entrapped at a corner defined by the second top end 31 of the shell 30 and the left side wall 307 of the second peripheral wall 301.

Preferably, the lower space 352 of the second receiving space 35 has a volume greater than a value obtained by subtracting the volume of the first receiving space 25 from the volume of the upper space 351 of the second receiving space 35 so as to assure the excess amount of the liquid sample will only fill

the lower space 352 of the second receiving space 35.

Preferably, the tube 20 has an inner diameter (d) ranging from about 0.5mm to 4mm, and a length (indicated as reference character "S2" in Fig. 5), which extends from the first top end 21 to the first bottom end 23, ranging from about 50mm to 120mm. More preferably, the inner diameter (d) of the tube 20 ranges from about 1.5mm to 3mm, and the length (S2) of the tube 20 ranges from about 70mm to 90mm.

The shell 30 has a length (indicated as reference character "S3" in Fig. 5), which extends from the second top end 31 to the second bottom end 32, ranging from about 20mm to 40mm, a width (indicated as reference character "W1" in Fig. 4), which extends from the left side wall 307 to the right side wall 308, ranging from about 5mm to 20mm, and a thickness (indicated as reference character "W2" in Fig. 4), which extends from the front side wall 305 to the rear side wall 306, ranging from about 2mm to 10mm. More preferably, the length (S3) of the shell 30 ranges from about 25mm to 35mm, the width (W1) of the shell 30 ranges from about 8mm to 12mm, and the thickness (W2) of the shell 30 ranges from about 4mm to 6mm.

Preferably, the rib 39 has a length (indicated as reference character "S4" in Fig. 5), which extends from the second bottom end 32 to the top edge of the rib 39, ranging from about 5mm to 30mm. More

preferably, the length (S4) of the rib 39 ranges from about 10mm to 20mm.

Preferably, the first and second peripheral walls 24, 301 have a wall thickness ranging from about 0.3mm to 1.0mm, and more preferably from about 0.4mm to 0.6mm. Preferably the vertical distance (S1) ranges from about 1mm to 15mm, and more preferably from about 3mm to 10mm.

With the design of the shell 30, the drawbacks associated with prior art can be eliminated.

With the invention thus explained, it is apparent that various modifications can be made without departing from the spirit of the present invention. It is therefore intended that the invention be limited only as recited in the appended claims.